Chapter Three

The Role of Other Federal Agencies in Prevention

- **Federal Agency Pollution Prevention Activities**
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  - **U.S. Agency for International Development**
  - **Department of Commerce**
  - **Department of Defense**
  - **Department of Energy**
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  Fran McPoland, Federal Environmental Executive

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Introduction

With passage of the Pollution Prevention Act of 1990, pollution prevention became the national policy of the U.S. Government. The federal government is uniquely situated to promote and implement pollution prevention through its various roles:

- As *policy maker and regulator,* the government can exert influence through policies, education, regulations, and enforcement.
- As the nation's single largest *consumer and purchaser of goods and services,* the federal government can help create markets for environmentally-preferable products and technologies.
- As a *manager of facilities and generator of pollution,* the federal government can set an example for excellence in pollution prevention and waste management. The federal government is the nation's largest property owner and holds one-third of the nation's land area.
- As an *advocate for technology,* the federal government can help accelerate the flow of pollution prevention technologies through policies and programs that support research and development and technology transfer.

The federal government is uniquely situated to promote and implement pollution prevention through its various roles.

A number of government-wide actions have begun to put the national policy of pollution prevention into practice. An Assistant Secretary-level Interagency Task Force oversees implementation of the government's long-term pollution prevention efforts. The environmental review process established in the Pollution Prevention Act and supported by the National Environmental Policy Act helps to ensure that adverse environmental impacts of proposed government activities are adequately considered in the decision-making process.

Over the last six years, various federal agencies and departments have made significant strides in promoting a pollution prevention ethic internally and externally. The stimulus for much of this activity has been a series of laws and executive orders that have pushed federal agencies to adopt pollution prevention measures and guided their efforts as they did so. A summary of major milestones since 1990 is presented in Table 3-1. EPA has also been encouraging federal agencies to find innovative ways to prevent pollution both in their own activities and in the multiple interactive effects their activities have on other segments of society.

One of the most noteworthy landmarks in federal agency activity was Executive Order 12856, which requires federal agencies to report releases of toxic chemicals to EPA's Toxics Release Inventory (TRI), to develop agency-wide and facility-specific pollution prevention plans, and to reduce toxic chemical releases by 50 percent by 2001. Sixteen of the major federal agencies have developed pollution prevention strategies to achieve these and other pollution prevention goals.

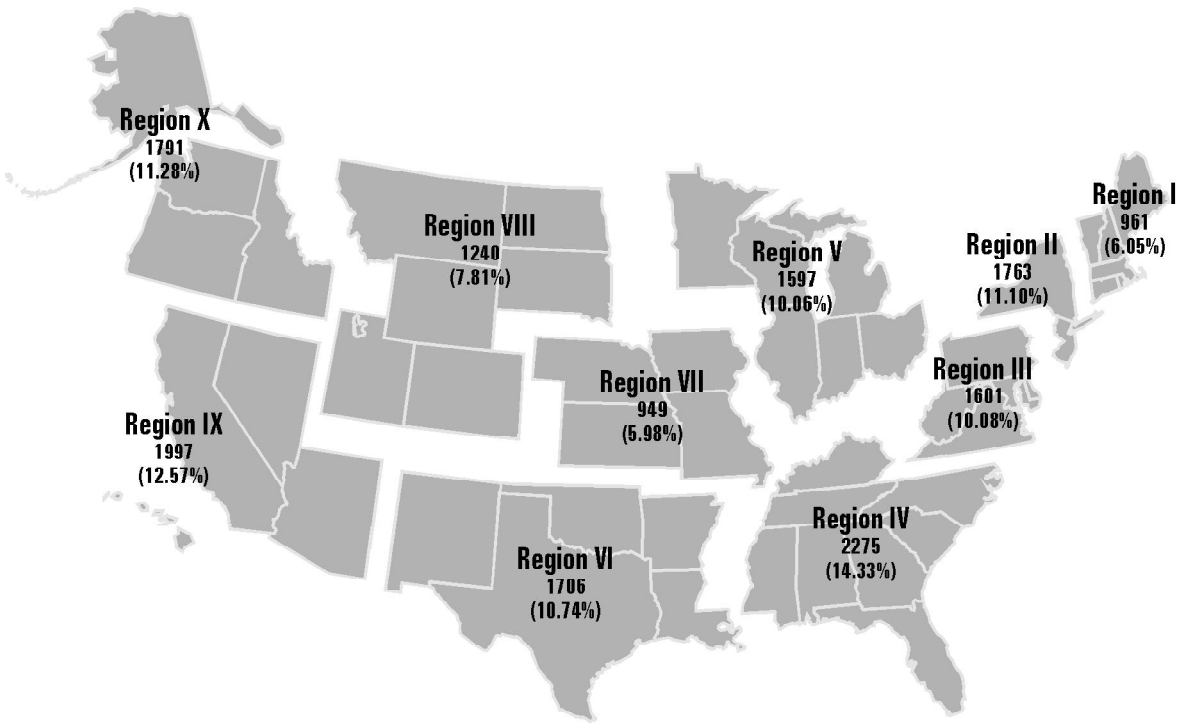
Federal facilities reported a 23.6 percent decrease in releases of toxic chemicals from 1994 to 1995, according to TRI data. Whether that decrease is due to pollution pre-

vention measures or the fewer number of facilities reporting in 1995 (144 rather than 193) is not yet clear. Table 3-2 summarizes the most recent TRI data for federal agencies. As the table shows, five federal agencies account for 99 percent of all federal agency reported releases — the Department of Defense (71 percent), U.S. Enrichment Corporation. (8.5 percent), Department of Energy (7 percent), National Aeronautics and Space Administration (6 percent), and the Department of Agriculture (6 percent).

Several of the larger agencies achieved substantial reductions between 1994 and 1995. They include a 27 percent decrease for the Department of Defense, 8 percent for the Department of Energy, 14 percent for the National Aeronautics and Space Administration, and 12 percent for the U.S. Enrichment Corporation.

As strategies and policies are adopted and institutionalized, the emphasis is shifting to bringing pollution prevention to the facility level. EPA maintains a computerized Federal Facilities Tracking System with information on approximately 12,000 facilities of civilian federal agencies. (The total universe of federal facilities, including

Figure 3-1. Total Number of Federal Facilities Per EPA Region



Source: EPA. *Federal Facilities Sector Notebook: A Profile of Federal Facilities.* Washington, DC (EPA 300-B-96-003, January 1996).

those of the Department of Defense, is about 15,880.) Figure 3-1 shows the geographic distribution of federal facilities by EPA Region.

Over 5,000 federal facilities are currently in the process of preparing field-level plans in response to Executive Order 12856 and other requirements. Many federal facilities have environmental management systems in place or are considering adoption of the ISO 14001 Environmental Management Standard. As another alternative, EPA recently issued a Code of Environmental Management Principles, developed in consultation with other federal agencies under Executive Order 12856. Individual facilities and agencies are encouraged to adopt the Code, which embodies five principles: management commitment, compliance assurance and pollution prevention, necessary enabling systems, performance and accountability, and measurement and improvement.

This chapter presents a sample of the activities of federal agencies that have been particularly active in pollution prevention. Federal agency pollution prevention activities include program and facility management, research and development, technological innovation, information transfer, partnership programs, and acquisition.

Table 3-1. Pollution Prevention Milestones

Pollution Prevention Milestone	Description
September 1990 - Science Advisory Board report calls for pollution prevention	In this influential report, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, EPA's Science Advisory Board stated as a major recommendation that "EPA should emphasize pollution prevention as the preferred option for reducing risk." The report further points out that "some pollution prevention techniques...can pay for themselves quite apart from environmental considerations."
November 1990 - Pollution Prevention Act of 1990	Congress affirmed its commitment to a new approach for improving environmental quality by passing this legislation. Congress recognized the important leadership role that federal agencies must play in the pollution prevention arena. In the Act, Congress directed EPA to: (1) promote source reduction practices in other federal agencies and, (2) identify opportunities to use federal procurement to encourage source reduction.
January 1991 - EPA issues National Pollution Prevention Strategy	The National Pollution Prevention Strategy (FR 56:7849-64, February 26, 1991) outlines EPA's pollution prevention policy. EPA's National Strategy also commits the Agency to develop similar strategies for other sectors of the economy, including agriculture, energy and transportation, and the federal government.
April 1991 - Executive Order 12759 (Federal Energy Management)	This order directs all federal agencies, among other things, to reduce their energy use and increase energy efficiency in federal buildings and facilities by at least 20 percent from 1985 levels by the year 2000.
October 1991 - Executive Order 12780 (Federal Recycling and Procurement Policy)	This order was designed to promote a greater role in waste reduction and recycling on the part of all federal agencies and to set up a special council that will monitor and report on agency performance. Under the EO, each federal agency must initiate a waste reduction and recycling program, and must designate an Agency Recycling Coordinator responsible for coordinating agency activities on waste reduction and recycling and for reporting the information to EPA. The order also establishes a Council on Federal Recycling and Procurement Policy to encourage active participation in waste reduction, recycling, and procurement programs, recommend changes in federal agency specifications and standards to enhance acquisition of recycled products, and showcase effective programs being developed.

Table 3-1. Pollution Prevention Milestones (Cont'd)

Pollution Prevention Milestone	Description
April 1992 - EPA and the U.S. Department of Agriculture (USDA) signed a Memorandum of Agreement to implement increased pollution prevention	The Memorandum of Agreement (MOA) puts in place a plan to address agriculturally related environmental problems and to implement increased pollution prevention in the agricultural sector. The Agreement outlines four basic strategies to achieve environmental results: (1) implementation of a nationwide pollution prevention program to minimize agriculturally-related pollution and environmental risks; (2) establishment of a coordinated research, technology development, and technology transfer system that supports production practices that protect and enhance the environment; (3) implementation of a comprehensive marketing strategy to promote voluntary pollution prevention; and (4) strengthening of the working relationship between EPA and USDA in order to provide a unified force for positive change in the area of agricultural pollution prevention.
September 1992 - Policy Directive issued by the Secretary of Energy	The Directive commits DOE to participate in the 33/50 Program and initiate full voluntary Toxics Release Inventory (TRI) reporting for all DOE facilities. DOE agreed to strive to achieve, by the end of 1995, a 50 percent reduction in releases of 17 priority chemicals from facilities that are currently required to submit TRI reports; all other DOE facilities would initiate voluntary TRI reporting beginning in 1993, with a 33 percent reduction goal for the 17 chemicals by the end of 1997. DOE also agreed to initiate a review of its specifications and standards, beginning with reductions in the use of the 17 priority chemicals in the 33/50 Program.
October 1992 - Energy Policy Act of 1992	The law gives a major boost to energy efficiency and renewable energy. It includes provisions on alternative fuels, electricity, global warming research, and more. To encourage energy efficiency, the law uses a mixture of voluntary and mandatory measures, requiring new efficiency standards for appliances that use energy and water. The law promotes the use of alternative fuels, requiring certain federal, state and private fleets of cars to increase their number of alternative-fueled vehicles. Tax credits and federal loan support are provided for renewable energy projects; a variety of research programs are authorized as well. The Act also gives whole-sale power producers greater, more affordable access to transmission lines and transmission services.
April 1993 - Executive Order 12843 (Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances)	Federal agencies are directed by this order to purchase products that contain non-ozone depleting components to the extent economically feasible. Through affirmative procurement the U.S. government will provide the leadership to phase out ozone depleting products on a worldwide basis.

Table 3-1. Pollution Prevention Milestones (Cont'd)

Pollution Prevention Milestone	Description
April 1993 - Executive Order (Federal Use of Alternative as Fueled Vehicles) 12844	Under this order, federal agencies are directed to aggressively procure alternative fueled vehicles in order to stimulate the market for such products well as push the state of technology.
April 1993 - Executive Order 12845 (Purchasing Energy Efficient Computer Equipment)	This order directs federal agencies to procure computers, monitors and printers that meet EPA's Energy Star energy specifications. Equipment meeting specific energy reduction criteria bears an Energy Star label.
August 1993 - Executive Order 12856 (Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements)	This order requires federal agencies to comply with the following: 1) develop a facility-wide pollution prevention plan by December 31, 1995, including a 50 percent reduction in toxic chemicals by 2001; 2) ensure that pollution prevention plans support agency-wide reduction strategies and goals; 3) establish agency plans and goals to eliminate or reduce acquisition of products containing hazardous substances or toxic chemicals; 4) make all pollution prevention strategies, plans, and TRI reports available to surrounding communities; 5) comply with EPCRA emergency planning and response requirements; and 6) report releases and transfers of toxic chemicals to the TRI. These federal agency pollution prevention plans will direct implementation of EO 12856 at more than 2,400 covered facilities throughout the country.
October 1993 - Executive Order 12873 (Federal Acquisition, Recycling and Waste Prevention)	This order directs federal agencies to set goals for solid waste prevention and recycling to be achieved by 1995 and to implement affirmative acquisition programs for all designated EPA guideline items purchased (replaced EO 12780). EPA must issue guidance on environmentally preferable products and expedite the process of designating products with recycled content. The EO establishes high-level environmental executive positions and staffing to ensure implementation of the directives, establishes model facility and recycling programs, and sets minimum recycled content standards for printing and writing paper. Federal agencies that meet the objectives of this order are recognized with the White House Closing the Circle Award (discussed in the next table).
March 1994 - Executive Order 12902 (Energy Efficiency and Water Conservation at Federal Facilities)	This order requires agencies to set goals of reducing energy consumption, increasing energy efficiency, auditing their facilities for energy and water use, purchasing energy-efficient products, increasing the use of solar and other renewable energy sources, designating a "showcase" facility, and minimizing use of petroleum-based fuel.
August 1995 - Executive Order	This order directs federal agencies to procure products with companies that

Table 3-1. Pollution Prevention Milestones (Cont'd)

Pollution Prevention Milestone	Description
12969 (Federal Acquisition and Community Right to Know)	are in compliance with TRI reporting requirements.

Table 3-2. TRI Data for Federal Facilities

Federal Agency	Total 1995 Releases (millions of pounds)	Percent Change in Chemicals Reported in 1994/1995
Department of Agriculture	474.9	-
Department of Defense	5,615.3	-26.7
Air Force	3,651.8	-25.5
Army	917.6	-29.1
Army Corps of Engineers	22.4	0.2
Defense Logistics Agency	5.3	-83.1
Marines	375.0	-26.5
Navy	643.1	-28.9
Department of Energy	581.9	-7.7
Department of Health and Human Services	0	-100.0
Department of Interior	4.8	316.5
Department of Justice	32.5	-64.8
Department of Transportation	16.5	-30.7
Department of Treasury	37.6	493.3
Department of Veterans Affairs	0	-
Environmental Protection Agency	0	-45.0
National Aeronautics and Space Administration	474.0	-13.7
Tennessee Valley Authority	13.6	-100.0
U.S. Enrichment Corporation	675.7	-11.7
Total	**7,927.0**	**-23.6**

Source: EPA. *1995 Toxics Release Inventory: Public Data Release* (EPA 745-R-97-005, April 1997). Tables 4-16 and 5-7.

Under Executive Order 12873, federal agencies are recognized for their achievement in meeting the objectives of this order; for this purpose, the White House Closing the Circle Award was established. The categories of this award are described in Table 3-3.

Table 3-3. Closing the Circle Awards[1]

Award Category	Description
Waste Prevention	This award is given to nominees who have made significant reductions in: • the generation of non-hazardous, solid wastes from a federal facility through any changes in the design, manufacturing, or use of materials or products; or • the amount of toxicity in waste materials before becoming municipal solid waste.
Recycling products	This award is given for collection, separation and processing by which or other materials are recovered from the solid waste stream for use in the manufacture of new products (other than fuel for producing heat or power by combustion).
Affirmative Procurement	This award recognizes the most effective programs implemented to purchase and use products containing recovered materials at a federal site, facility, or operation. The award focuses on those products designated by the EPA Comprehensive Procurement Guidelines (CPG), covering 24 different items.
Environmental Innovation	This award recognizes the best examples of: • acquiring, using or validating products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose; • outstanding improvements to a process that result in significant monetary savings and benefit the environment; and, • product testing that leads to the approval and use of environmentally sound products and services.
Model Facility Demonstration	This award is given to federal facilities that have made outstanding contributions to waste prevention, recycling and affirmative procurement through leadership, investment in resources, and change in culture.
Sowing the Seeds of Change	This award is given to programs that do not fall under one of the previous five categories. The Closing the Circle Award Program does not limit consideration for award recognition to strict parameters; its objective is to recognize all applicable environmental innovations and successes.

[1] Nomination forms for Closing the Circle Awards are available from the Office of the Federal Environmental Executive (OFEE) (202-260-1297). Recent winners of these awards are profiled in *Closing the Circle News*, also available from the OFEE.

Federal Agency Pollution Prevention Activities

Department of Agriculture

The U.S. Department of Agriculture (USDA) contributes to pollution prevention through a number of programs. Many of these programs have emphasized reducing pollution from excessive agricultural chemicals or soil nutrient management and soil conservation issues. Programs dealing with pesticide reduction and environmentally sound use are found in several USDA agencies, including the Cooperative State Research, Education, and Extension Service, which maintains several grant programs in research and extension in this area, the Agricultural Research Service, the Forest Service, the Natural Resource Conservation Service, and the Animal and Plant Health Inspection Service.

One major pollution prevention program is the $12 million a year Sustainable Agriculture Research and Education (SARE) program, in which EPA also participates. This program provides competitive grants for research, education, and extension projects through four regions of the country. These projects help farmers reduce pesticide use and manage fertilizers and animal wastes more efficiently and with less environmental impact. The projects also assist farmers reduce other input use that could contribute to water and air pollution, such as energy use. The program relies heavily on farmer involvement and is particularly supportive of projects taking a systems approach to agricultural and environmental problems. EPA participates in all facets of the SARE program, particularly the joint USDA-EPA program, Agriculture in Concert with the Environment (ACE). The ACE program provides grants aimed at pollution prevention and other environmentally-related agricultural issues.

U.S. Agency for International Development

The U.S. Agency for International Development's (U.S. AID) Environmental Pollution Prevention Project (EP3) program is a global initiative focused on creating and supporting locally sustainable pollution prevention programs to address industrial and urban waste problems in developing countries.[2] EP3 provides technical assistance to help participating countries understand how pollution prevention can be used to address environmental problems. This assistance falls into four general categories: diagnostic assessments and other technical assistance; training; information dissemination; and assistance in developing sustainable government and non-governmental pollution prevention programs.

EP3 has established pollution prevention offices in Santiago, Chile, and Tunis, Tunisia. Two additional offices are being established in Egypt and Ecuador. The program also has a Headquarters (HQ) Clearinghouse that serves as a repository and distribu-

[2] U.S. EPA, *Envirosense EP3 Program Summary.*

tion point for pollution prevention information. The HQ Clearinghouse contains approximately 1,000 items compiled into the EP3INFO data base. The HQ Clearinghouse, through its linkage with INFOTERRA/USA, has access to several hundred data bases, EPA documents, and other information sources. This linkage allows the HQ Clearinghouse to offer users worldwide access to a wide range of pollution prevention resources. The EP3INFO data base also has been distributed to local clearinghouses in Chile and Tunisia. Similar clearinghouses will be established as new program offices are opened in additional countries.

As an example of EP3 activities abroad, EP3's program in Chile has an independent Pollution Prevention Center. The steering committee consists of the American-Chilean Chamber of Commerce (AMCHAM), USAID/Chile, and EP3. EP3's office in Chile is headed by a Chilean engineer, and a group of 16 in-country consultants are providing pollution prevention consulting services beyond EP3 project support. The program has trained Chilean nationals in pollution prevention, and established a clearinghouse with the Centro de Investigacion y Planificacion del Medio Ambiente (CIPMA) in August 1994. CIPMA is an environmental information center that provides information to industry and academia through its main office in Santiago and eight regional network nodes throughout the country.

EP3's office in Chile has also conducted assessments for a wide range of industries such as textiles, leather tanning, printing, paint processing, metal finishing, and processing.

Department of Commerce

Congress established the U.S. Department of Commerce Technology Administration's National Institute of Standards and Technology (NIST) "...to assist industry in the development of technology...needed to improve product quality, to modernize manufacturing processes, to ensure product reliability...and to facilitate rapid commercialization...of products based on new scientific discoveries." The primary mission of NIST is to promote U.S. economic growth by working with industry to develop and apply technology, measurements, and standards.[3] This mission is carried out through four major programs:

- A competitive Advanced Technology Program that provides cost-shared grants to industry for the development of high-risk technologies with significant commercial potential (including pollution prevention technologies);
- A grassroots Manufacturing Extension Partnership that helps small and medium-sized companies adopt new technologies (including pollution prevention technologies);
- A laboratory effort planned and implemented in cooperation with industry that focuses on measurements, standards, evaluated data, and test methods; and

[3] U.S. Department of Commerce, Technology Administration*Guide to NIST - National Institute of Standards and Technology.*

- An outreach program associated with the Malcolm Baldridge National Quality Award.

MEPs Information/Technology Assistance

The Manufacturing Extension Partnership (MEP) is a true partnership of federal and state organizations working together to address the needs of small and medium-sized manufacturers. At the heart of the MEP system is a network of regional manufacturing extension centers in all 50 states and Puerto Rico. MEP works with state and local organizations to either establish a new program or expand existing services for smaller manufacturers. Located throughout the country, these centers are created through a match of federal, state, and local funding. They are not federal offices, but instead are not-for-profit organizations.

Preliminary Census surveys of MEP clients indicate that the national system is projected to create or save over 30,000 jobs annually and help companies achieve sales $550 million higher than if they had not received MEP services.

Centers provide direct services to smaller manufacturers, helping them address their most critical needs in areas such as production techniques, technology applications, and business practices.

The MEP Environmental Program works to strengthen the environmental competitiveness of small manufacturers. The Program works with MEP centers and affiliated organizations to integrate environmental services into the manufacturing extension services of the MEP system. The Environmental Program manages and funds the development of environmental tools and supports the training of MEP field agents and their local partners in providing environmental and manufacturing technical assistance to small and medium-sized manufacturers.

MEP now has affiliate centers in all 50 states and Puerto Rico.

Department of Defense[4]

The Environmental Quality Program is an integral part of the overall mission of the Department of Defense (DoD). Environmental considerations permeate all aspects of the development and operation of an installation and the development, testing, procurement, deployment, and final disposal of a weapon system. DoD's Environmental Quality Program protects DoD personnel and surrounding communities from exposure to hazardous materials and reduces pollution to the air, land, and water.

The Secretary of Defense has identified three priorities for DoD, each of which is clearly linked to the Environmental Quality Program:

- **Readiness** - DoD must be able to test its weapon systems and train personnel so that it has the ability to accomplish its mission.
- **Quality of Life** - DoD must provide its personnel, both military and civilian, with a healthy environment in which to live and work.

[4] This information has been extracted from DoD's *Defense Environmental Quality Program, Annual Report to Congress for Fiscal Year 1995*. For a copy of this report, contact Jim Kennedy at (703) 604-1766.

- **Modernization** - DoD must provide its personnel with state-of-the-art equipment and facilities superior to that of any potential adversary.

DoD's Environmental Quality Program directly supports these objectives by managing the 25 million acres on which DoD conducts activities to provide realistic training opportunities; managing the flow of hazardous materials and wastes to ensure a safe environment for personnel; and introducing new materials and maintenance processes for weapon systems that reduce costs and improve performance.

In the following sections, DoD's efforts in pollution prevention, conservation, education and training, and environmental technology are discussed.

The DoD Environmental Quality Program

DoD's Environmental Quality Program is divided into the following major functions:

Planning is the foundation of the Environmental Quality Program. DoD's planning efforts focus on the development and operation of installations and the development, procurement, deployment, and disposal of weapon systems.

Compliance includes all activities required to meet the standards established by laws such as the Clean Air Act (CAA), the Clean Water Act (CWA), and the Resource Conservation and Recovery Act (RCRA). These laws are designed to protect human health and the environment. Failure to comply with environmental laws can place personnel at risk; make surrounding air, land, and waters unsafe; and result in penalties, shutdowns, or restrictions on mission activities.

Pollution Prevention protects human health and the environment by reducing or eliminating pollution problems rather than controlling them. Pollution prevention can be used as a means of achieving compliance and usually involves good business decisions that reduce overall costs.

Conservation involves the maintenance and protection of both natural and cultural resources that have been entrusted to DoD's care. A healthy natural environment contributes to realistic training as well as quality of life. Protection of cultural resources preserves the nation's heritage.

Education and Training ensures that DoD personnel understand the environmental responsibilities of their jobs and therefore support the achievement of DoD's overall Environmental Quality Program.

Environmental Technology seeks new technologies that meet environmental requirements at less cost.

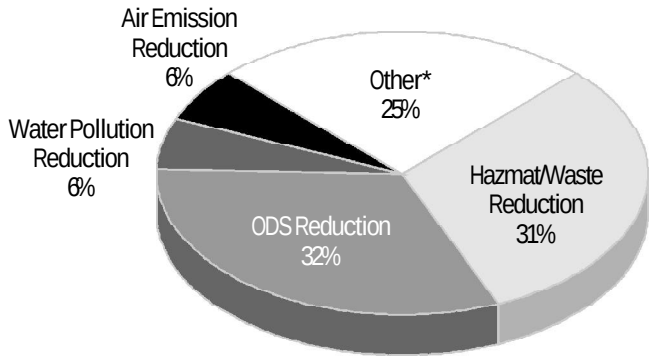
Pollution Prevention

DoD is focusing on source reduction, reuse, and recycling in lieu of "end-of-pipe" treatment and disposal as its preferred method of protecting human health and the environment and meeting current legal requirements. This preventive approach reduces future environmental and legal risks and Operations and Management (O&M) costs.

During FY95, DoD invested over $284 million in pollution prevention. The O&M accounts provided 55 percent of this investment. The procurement account was another major contributor (28 percent).

Figure 3-2 shows the distribution of pollution prevention funds. Approximately 32 percent of the funds were used to reduce the use of ozone depleting substances (ODS), 31 percent to reduce the use of hazardous materials and generation of hazardous waste, 25 percent to reduce solid waste disposal and support recycling activities, 6 percent to reduce water pollution, and 6 percent to reduce air pollution.

Figure 3-2. DoD Pollution Prevention Funding for FY95 (by Media)



* Other includes nonpoint source pollution reduction, toxic release reductions, solid waste reduction, and "other."

DoD has encouraged installations to seek smarter ways of doing business and to reduce environmental costs through the establishment of goals. One goal is to reduce the amount of hazardous waste disposed 50 percent by 1999 from a 1992 baseline. As the first step in achieving this goal, installations were required to complete opportunity assessments and develop pollution prevention plans by the end of 1995. The assessments identified the users of hazardous materials and the generators of hazardous wastes. The plans identified alternative materials and processes and prioritized them based upon return on investment and environmental performance.

A large reduction in the purchase of hazardous materials and the disposal of hazardous wastes can be attributed to improved business practices. DoD components are establishing centralized systems, known as pharmacies, for buying, storing, distributing, and disposing of hazardous materials at many installations and on most ships. Materials are distributed to industrial shops on a "just-in-time" basis and in quantities sufficient only for the immediate task. This practice reduces: the amount of hazardous materials purchased, losses due to shelf-life expiration, the number of accumulation points (and the potential for violations), and the amount of hazardous waste disposed. The Navy is implementing this program at 73 shore facilities and on 140 ships and estimates a cost avoidance of more than $20 million for FY95. Similar successes are reported by the Army and Air Force.

DoD also is implementing a program to dramatically reduce its releases of toxic chemicals under Executive Order 12856. For 1994, the first year that requirements to report releases of toxic chemicals applied to DoD, 131 of 425 major DoD installations had toxic releases that exceeded the threshold levels. The 1994 baseline, by which progress is to be measured in future years, included both on-site releases to air, land, and water as well as off-site transfers of waste for treatment, storage, or disposal. The total

amount released during the baseline year was 11.46 million pounds. About two-thirds of this total was released on-site primarily as air emissions. The remaining one-third was waste transferred off-site. The total of all DoD reported releases was less than one-half of one percent of the total releases from private industry reported in 1993 (most current data available).

In the past five years, DoD has conducted an aggressive program to eliminate the use of ozone-depleting substances (ODSs). This effort was motivated by the production phaseout of ODSs by the end of 1995 in accordance with the international Montreal Protocol Treaty. The Department must identify and validate alternative materials before changes can be made. Typical investments included the purchase of aqueous washers to replace cleaning systems that used solvents containing ODSs. DoD reduced its procurement of ODS-based solvents and refrigerants from 14.6 million pounds in 1990 to 313,000 pounds in 1995 — a 98 percent reduction.

DoD has not found suitable substitutes for all materials and all applications. For example, no material has been found that will equal the performance of halon as a fire suppressant for jet aircraft engines. As a consequence, while research continues to seek an alternative, DoD must continue to use halon in its aircraft. Nevertheless, overall use of halon has been dramatically reduced, dropping from 10.3 million pounds in 1990 to 231,000 pounds in 1995 — a 97 percent reduction.

To reduce landfill disposal costs and potential environmental risks, DoD established goals to reduce the generation of nonhazardous waste and to increase recycling activities. The goals required a 50 percent reduction in the amount of nonhazardous waste shipped to landfills by 1999 from a 1992 baseline, and a 50 percent increase in the amount of waste recycled by 1999 from a 1992 baseline. Significant progress already has been made towards achieving these goals. For example, Naval Air Station Whidbey Island, Washington, when faced with the imminent closure of its landfill, implemented aggressive recycling and composting programs. In FY95, revenues from recycling exceeded $285,000. In the same period, cost avoidances through reductions in nonhazardous waste disposal totaled more than $784,000. Overall, DoD reduced nonhazardous waste disposal 20 percent and increased recycling 45 percent.

During FY95, DoD also developed new policies and procedures to substantially change the way in which weapon systems are developed and procured. The new policies required that environmental life-cycle costs be understood fully in the early stages of the acquisition process. This policy has encouraged developers of new weapon systems to seek alternative materials and processes that reduce future operations, maintenance, and disposal costs.

In FY97, DoD will continue to invest in projects to decrease its use of hazardous materials and its generation of pollutants. There will, however, be fewer investments related to ODSs since most uses already have been phased out. In FY97, DoD is launching two new initiatives that have the potential to significantly reduce future environmental costs. The first initiative, entitled ENVVEST, is intended to promote more effective use of environmental investments. Installation commanders will iden-

ENVVEST at Vandenberg AFB

In July 1996, a pilot ENVVEST project was launched at Vandenberg Air Force Base in California. Vandenberg was the first DoD installation to sign up for relief from selected EPA regulations, and plans to redirect environmental compliance funds into water conservation, air, and water pollution prevention projects. Among Vandenberg's proposals are a reduction in NOx emissions by a minimum of 10 tons during the five-year life of the pilot project, closed-loop recycling for wastewater, and on-site batch treatment plants at three major space launch complexes. DoD will conduct an independent evaluation of the progress of the program. At the kick-off event, DoD Under Secretary Sherri Goodman noted, "ENVVEST opens the door to creative solutions for local problems. In twenty years, we will look back at this event and wonder why we didn't do this sooner."

tify regulations that require large investments but produce little or no environmental improvement. Regulators, now allowed to relax enforcement of rules under specific circumstances, would enter into agreements with the commanders. These agreements would specify the regulations that would be relaxed and an alternative environmental approach that would be pursued. DoD anticipates that most of the alternative efforts would be high payback pollution prevention projects. The Department believes by using the flexibility permitted under this initiative, the installation could achieve greater overall environmental protection and reduce costs. The initiative will be tested at three to five installations.

The second initiative involves the use of data from the TRI to better focus pollution prevention and environmental technology efforts. The DoD components operate many weapon systems that were developed before there was full understanding of the liabilities and costs associated with the handling of hazardous materials and disposal of hazardous waste. Many specifications, cited by operations and maintenance manuals for these older systems, direct the use of hazardous materials. DoD intends to change these specifications to prescribe more environmentally benign substitutes. However, there are thousands of specifications to be reviewed and potentially changed. DoD must focus its efforts on those specifications that create the largest part of the problem. DoD proposes to analyze the TRI data to identify those processes and associated weapon systems that require priority attention.

Conservation

In FY95, DoD invested $152 million to support conservation activities. In order to meet its legal obligations and to properly operate and maintain operational ranges and maneuver areas, DoD established goals to complete inventories of special resources, such as threatened and endangered species habitat, and to prepare integrated management plans for both natural and cultural resources. The goals required that most inventories be completed by FY98 and all plans be completed by FY01.

DoD made significant progress towards achieving these goals. At the end of FY95, over 66 percent of the biological inventories and 68 percent of the wetlands inventories were completed. In addition, nearly 50 percent of the historic building inventories and 34 percent of the archaeological inventories were completed.

DoD also made substantial progress in the preparation of integrated management plans. Over 51 percent of the integrated natural resource plans and 36 percent of the integrated cultural resource plans have been completed.

In order to improve mission performance, DoD has made small investments in the study, protection, and enhancement of some natural resources. For example, it has studied the migratory patterns and nesting preferences of birds. This information has enabled flight planners to adjust low level aircraft training routes to reduce the potential of birdstrikes and the resulting loss of aircrews and aircraft. This information also assisted land managers in selecting maintenance practices that discourage birds from nesting near airports. In some instances, DoD has taken actions to promote plant and animal species, particularly those identified as threatened or endangered. These actions have led to increased operational flexibility on some installations.

DoD is convinced that natural resources should be managed as part of an entire ecosystem. This approach is being used in the Mojave Desert, where some of the most important training and testing installations are located. DoD, in coordination with other major landowners in the desert ecosystem, is collecting existing data on natural and cultural resources to develop a desert-wide land management plan. DoD anticipates that the resulting plan will give installation commanders more flexibility, protect installations from encroachment and restrictions on military operations, protect critical species, and support orderly economic development.

The Army is implementing new land management practices at its training ranges. Army exercises, when conducted without safeguards, can cause extensive damage to vegetation and terrain and undermine the effectiveness of future training activities. A comprehensive training land use management approach, called Integrated Training Area Management (ITAM), attempts to balance training needs with the ability of soils and vegetation to absorb and recover from training uses.

In FY97, DoD will continue to complete inventories and develop integrated management plans. In addition, in compliance with the Native American Graves Protection and Repatriation Act, DoD will continue efforts to identify human remains and associated funerary objects of Native American origin that have been uncovered on DoD lands and attempt to return them to appropriate representatives of Native American tribes for reburial.

Education and Training

DoD intends to educate or train all personnel, both military and civilian, to meet the environmental responsibilities associated with their jobs.

In FY95, DoD completed an inventory of all environmental education requirements and began to identify the most cost-effective means of satisfying them. When practical, DoD has embedded environmental education into existing courses. Environmental education has been incorporated into basic training and technical specialty training curricula. Environmental education also has been added to professional military education programs such as Army War College and Air Command and Staff College. DoD began to incorporate environmental education into courses offered by the Defense Acquisition University.

In FY97, DoD will prepare an environmental career development program. This program will aid the development of environmental personnel for positions of greater responsibility. For the first time, environmental professionals will have a clear vision of the environmental career ladder.

Environmental Technology

DoD is seeking innovative technologies to meet environmental performance standards in an effective, cost-efficient manner.

DoD's overall strategy for environmental technology is to identify and establish priorities among users' needs and match them if possible to existing technologies. If existing technologies are not available, then the development of new technologies is pursued through the environmental technology program.

In FY95, DoD invested over $164 million in environmental technology. Of this amount, approximately $108 million was invested in direct support of the Environmental Quality Program. Over $54 million was allocated for pollution prevention, $45 million for compliance, and over $9 million for conservation.

In FY95, the Air Force was designated executive agent for preparing the DoD Environmental Technology Requirements Strategy (DETRS). The first DETRS was published in March 1995. This document contained technology goals and requirements identified and prioritized by the users. It established the direction for future technology investments.

The Environmental Security Technology Certification Program (ESTCP) also was launched in FY95. This program also was established to demonstrate and validate the most promising new technologies to meet urgent DoD needs. Successful candidate projects were expected to achieve payback within five years.

There were a number of new technologies successfully implemented in FY95. The Navy successfully developed and fielded the plastic waste processing system to comply with the Marine Plastic Pollution Research and Control Act of 1987, as amended by the Defense Authorization Act of 1994. The Air Force implemented the aircraft component subsystem paint stripper. This is expected to reduce the amount of hazardous waste generated during stripping operations by 94 percent and the labor hours required to strip an aircraft by 50 percent.

In FY97, DoD will continue to invest in environmental technology projects. The effort will focus on problems that are unique to the military or offer significant reductions in current operations and maintenance costs. Examples include the development of an antifouling coating for ships and the development of an ultraviolet oxidation process to treat air systems contaminated with nitroglycerin and solvents.

Department of Energy

Program Management

In December 1995, the Department of Energy (DOE) was honored along with 20 private sector companies with an "Environmental Champion" award. The award, co-sponsored by EPA and McGraw-Hill Company's *Chemical Engineering* and *Environmental Engineering World* Magazines, was presented to DOE for its success in EPA's 33/50 Program. DOE, the only federal agency receiving an award, reduced its use of 17 targeted chemicals by 95 percent between 1988 and 1993.

DOE's Kansas City Plant

The Kansas City Plant, a Department of Energy facility, and a major generator of waste in the Kansas City area, has reduced the releases and transfers of its four EPA 33/50 Program reportable chemicals by 98.4 percent since 1988. This has been accomplished in cooperation with the Defense Programs Design Agencies by redesigning processes and substituting less hazardous or toxic materials. The uses of dichloromethane and 1,1,1-trichloroethane have been essentially eliminated. Trichloroethane and toluene usage have been reduced by 99 percent and 96 percent, respectively.[5]

DOE has renewed its efforts to prevent wastes wherever possible as a way to reduce costs. In her May 3, 1996 memorandum and accompanying 1996 Pollution Prevention Program Plan, Secretary of Energy Hazel O'Leary demonstrated the Department's commitment to pollution prevention by establishing DOE's most ambitious waste reduction, recycling, and affirmative procurement goals to date. These goals, to be achieved by the end of 1999, were developed in accordance with recent Executive Orders and internal departmental guidance. DOE field sites are required to set specific goals to help achieve the overall departmental goals.

In December 1995, DOE's Office of Environmental Management released the *Annual Report on Waste Generation and Waste Minimization Progress* for calendar year 1993. This report showed two trends: (1) environmental restoration and facility stabilization activities are the primary waste generating activities; and (2) DOE continues to reduce, recycle, reuse, and avoid waste generation wherever possible. The report also concluded that between 1991 and 1993 routine operations waste generation decreased 35 percent, while sanitary waste generation increased by approximately 26 percent.

DOE has institutionalized pollution prevention in several important ways:

- Establishing a top-level Pollution Prevention Executive Board, chaired by the Under Secretary, to set priorities and assist in achievement of goals;
- Creating an Office of Pollution Prevention within the Office of Environmental Management;

[5] 1996 DOE Pollution Prevention Awards Program: Abstracts of Nominations Selected for National Awards. DOE EPIC.

- Appointing pollution prevention program managers in other DOE Secretarial organizations that generate wastes, and installing pollution prevention coordinators at field sites;
- Decentralizing program implementation, thereby allowing each site to develop its own goals (designed to achieve DOE-wide goals) and to fund activities to achieve these goals, in a manner consistent with the best practices at that site, and;
- For FY97, elevating pollution prevention to the status of a "national program" so that it will no longer have to compete with mission activities in site budgets.

An Example from DOE's Return on Investment Pilot Program

A pollution prevention opportunity assessment was completed on machining processes at the ICF Kaiser Hanford Company machine shop. A hazardous waste stream consisting of machine coolant that contains persistent and toxic chemicals is generated each year at a cost of $138,000. In a return-on-investment (ROI) project funded by the Department of Energy's Richland Operations Office, a coolant recycling system was selected and installed for a total cost of $61,000; the annual cost savings exceeded $121,000 for an ROI of 188 percent.

In an effort to save taxpayer money while reducing waste, the Pollution Prevention Executive Board initiated a high return-on-investment (ROI) pilot program to fund specific pollution prevention projects with the greatest "payback" potential. The ROI program was initiated to demonstrate the economic benefit of implementing pollution prevention projects, focusing on those with high potential for reducing operational costs. Thirteen ROI projects were initiated in 1994 and an additional 21 were funded in 1996. Savings over the next ten years are projected to exceed $135 million (in 1996 dollars). Continued pollution prevention investments will steadily reduce hazardous and radioactive waste generation and will reduce the need for unnecessary expenditures for waste treatment, storage, and disposal. The ROI program is now decentralized to the field sites for implementation.

In an effort to encourage waste generator accountability, promote waste reduction, and provide a source of funds for pollution prevention implementation projects, the Pollution Prevention Executive Board created a system whereby generators set aside a portion of the costs related to the management of their wastes to be used for funding pollution prevention projects. This pilot demonstration will serve as the template for similar set-aside programs at other sites.

Incorporating performance-based incentives for DOE contractors to minimize waste streams has significantly energized the pollution prevention program at field sites. For FY 1996, Savannah River Operations Office set aside nearly $1.3 million, almost ten percent of the total site award fee contract, to motivate its prime contractor to implement pollution prevention initiatives that will minimize wastes. Specific language was negotiated in the Savannah River annual operations plan that required achievement of source reduction through documented waste minimization initiatives in order to qualify for fee dollars. These performance objectives were calculated on

the basis of levels of waste forecast to be generated and disposed of during the upcoming year.

Likewise, the Oakland Operations Office has succeeded in encouraging pollution prevention activities in non-profit research laboratories operated by the University of California. The Lawrence Berkeley and Lawrence Livermore National Laboratories have achieved a far greater waste reduction in the past two years than those Oakland sites that did not have pollution prevention performance measures in their contracts. By incorporating specific pollution prevention expectations in the laboratory performance plans, these two sites have reduced waste nearly 25 percent compared to 1993.

Information/Technology Transfer

The DOE Pollution Prevention Information Clearinghouse (EPIC) was developed under a joint effort with the DOE and EPA to enhance the exchange of pollution prevention information among federal, state, and local government agencies, as well as with industries, academic institutions and the general public. The EPIC system, previously a bulletin board system, became a Web site in February of 1995. The system provides access to federal and state pollution prevention regulations, DOE pollution prevention policy and guidance, special DOE reports and memos, site project summaries, Pollution Prevention Opportunity Assessments, newsletters, pollution prevention contacts, and other periodic reports.

DOE sponsors an annual Pollution Prevention Conference; in 1996 it was attended by over 400 DOE and contractor personnel. This three-day conference included sessions on the following topics: model facilities, microchemistry, customers/ stakeholders, solvents and reduction, education and outreach planning, return on investment, energy management, decontamination and decommissioning, planning and regulations, environmental restoration, solid waste, recycling, affirmative procurement, construction and demolition, and the application of standardized approaches to pollution prevention.

Annual DOE Pollution Prevention Conference

DOE honored winners of eleven national pollution prevention awards in a ceremony on July 10, 1996, in Chicago. Associate Deputy Secretary for Field Management Donald W. Pearman, Jr., presented awards to DOE employees and contractors as part of the 12th DOE Pollution Prevention Conference. The special plaques designed for the awards program were fabricated from recycled computer circuit boards by the Kansas City Plant in an innovative process developed in conjunction with a Texas-based corporation.

Technology Innovation

The ongoing and planned cleanup of DOE facilities and systems will generate huge volumes of low-level, radioactive, non-putresible waste. Pollution prevention practices and the development of viable recycling and reuse programs for these materials are imperative to constrain the escalating costs of treatment, storage, and disposal. The following technology initiatives will help reduce waste generation.

Recycling slightly radioactively-contaminated metals — carbon steel, stainless steel, and nickel — into useful products is a cost-effective alternative to disposal. For ex-

ample, stainless and carbon steel can be melted and refabricated into standard-sized disposal containers that can replace virgin metal containers currently used. Similar research on the viability of other materials (e.g., concrete, depleted uranium) for reuse as aggregate or as shielding material is proceeding.

A cost-effective program for integrated planning, hazard assessments, waste management, and use of an innovative technology was implemented at the Formerly Utilized Sites Remedial Action Program General Motors site resulting in savings of over $1.6 million. By aggressively looking for opportunities in a number of key areas in the remediation process, waste volumes were reduced from 1,500 cubic yards to 175 cubic yards, wastewater was disposed of at a savings of over $20 per gallon, and the impact of the cleanup on ongoing plant operations at the site was minimized.

Source reduction of waste streams is performed wherever feasible. DOE sites use a number of techniques to reduce landfill usage. The Oak Ridge Y-12 site has established a goal to achieve total recycling of waste streams such as paper, aluminum, and scrap wood. The DOE recycling program was designed to 1) increase the longevity of the landfill disposal sites, 2) reduce costs, 3) conserve energy and natural resources, and 4) comply with federal waste minimization regulations. Due to the success of the site-wide paper and aluminum recycling program, some sites have identified additional waste streams for recycling. These streams include coal ash, automotive wastes from vehicle maintenance, fluorescent bulbs, and toner cartridges as well as surplus materials re-routed from disposal to the materials exchange.

Alternative Solvent Developed

Synergy CCS™ is an environmentally derived, surfactant-free, recyclable-Critical Cleaning Solvent. The Kansas City Plant, a Department of Energy facility, formulated the solvent in response to a problem of a small manufacturer. The solvent was further developed and adopted by Hewlett Packard, and then licensed to a world leader in alternative solvent technology, Petroferm, Inc. *Synergy CCS*™ provides a wide range of cleaning capabilities for electrical and mechanical components. Its ingredients are listed by the EPA as "approved" and biodegradable. It is derived from naturally and annually renewable sources, can be distilled after use, and is compatible with most existing cleaning equipment.

The 242-A Evaporator facility is part of the Tank Waste Remediation System used at the Hanford site to reduce the volume of radioactive waste stored in double-shell tanks. Filtered raw water was used in the evaporator process, contributing to condensate eventually requiring treatment. A modification to the evaporator replaced the use of filtered raw water by recycling a portion of the process condensate effluent, reducing both raw water usage and process condensate requiring further treatment. Cumulative savings over the projected operating life of the 242-A Evaporator should exceed $10 million, greatly exceeding the original $230,000 cost of the modification.

The pollution prevention/waste minimization program at the DOE Pantex Plant in Texas and the Savannah River Site in South Carolina received White House Closing the Circle Awards in 1996 for achievements in recycling and waste prevention. The awards recognized the plants' outstanding pollution prevention programs, which contain 16 elements ranging from establishment of a plant-wide pollution prevention

philosophy and enhanced communication to the creation of employee incentives and goal setting.

Research and Development

A recent agreement between DOE's Lawrence Livermore National Laboratory (LLNL) and EPA will encourage the development and commercialization of new environmental technology by scientists and engineers. The agreement provides California with the services of skilled lab personnel and unique lab facilities to evaluate new environmental technologies in hazardous waste management, site cleanup, waste minimization and pollution prevention for certification by California's landmark Environmental Technology Certification Program. The program provides one-stop scientific and engineering evaluation of new technologies to encourage development and speed their acceptance.

Cooperative Agreements/Partnerships

The Department of Energy's Office of Industrial Technologies (OIT) continued to implement its Industries of the Future strategy. OIT's strategy is to facilitate partnerships with seven materials and process industries -- steel, aluminum, metalcasting, forest products, glass, chemicals, and refineries. Collectively, these industries use over 80 percent of the energy and generate over 80 percent of the waste in U.S. manufacturing. Industry will lead the creation of long-term visions and develop associated "roadmaps" of technologies needed to get there. The government plays a supportive role by facilitating meetings, providing information and planning support, and coordinating with government agencies, DOE labs and other partners. The technologies which OIT supports are also priorities for industrial customers who share in the development cost. This assures not only relevance to industry needs but rapid commercial introduction following technical success.

Acquisition Programs

The Department's affirmative procurement efforts are well underway and are bearing fruit. In the *1996 Pollution Prevention Program Plan,* the Secretary set a goal to increase the procurement of EPA-designated recycled items to 100 percent by the end of 1999. In 1994, DOE sites reached a 46 percent affirmative procurement level. Guidance to field sites will help to increase affirmative procurement by providing useful information, such as a list of sources of recycled items, the relevant Federal Acquisition Regulation information, the pertinent DOE Acquisition Regulation information, and the latest EPA documents such as Recovered Materials Advisory Notices and Comprehensive Procurement Guidelines.

DOE also maintains recycling programs at Headquarters and at most field sites. In 1993, the Department recycled approximately one-third of the total sanitary waste it generated. DOE developed the Recycled Materials Affirmative Procurement Tracking System (ReMAPTS) to track its progress in buying recycled products and to track the recycled content in items purchased. It was developed in response to a request by the Deputy Secretary as a way for DOE to show its commitment to Executive Order

12870 (superseded by EO 12873). The benefits of using ReMAPTS are that it summarizes data for the Affirmative Procurement Reporting System (APRS), thus providing greater detail and improved accuracy while requiring less time for compiling year-end reports.

The APRS is a DOE-wide electronic data call for those required to report on affirmative procurement. The system is in the form of diskettes (DOS and Windows versions) or on the Internet through the EPIC home page. The Internet site is a new development for FY 1996 reporting and is available to DOE sites. Benefits of the Internet site include eliminating the need to mail computer disks back and forth between sites and Headquarters, allowing sites to respond to the data call regardless of the type of computer systems they are using.

Product Energy Efficiency Recommendations

In an effort to increase energy-efficient procurement, the Federal Energy Management Program (FEMP) released the first seven of its Product Energy Efficiency Recommendations, a series of user-friendly, one-page guidelines designed for federal users. Each recommendation covers one type of equipment and provides the reader with an efficiency range representing the upper quartile (25 percent) of the market for comparable products, as well as a life-cycle cost analysis example which can help the user estimate cost-effectiveness. Relevant conservation tips regarding such issues as proper sizing and compatibility issues are also included, as is a reference section listing contact information for relevant organizations. In addition, some of the guidelines make environmental suggestions, such as responsible refrigerant policy. An additional 10 recommendations are due out in late fall 1996. Brochures are available by calling 1-800 DOE-EREC.

DOE's Office of Defense Programs and the General Services Administration have developed a procurement process for replacing chlorofluorocarbon refrigerants. Significant benefits gained by replacing chillers under this Basic Ordering Agreement (BOA) include: reducing the use of ozone depleting substances; reducing energy usage by replacing older, inefficient chillers with highly efficient chillers as recommended by the Federal Energy Management Program; reducing emissions from the generation of electricity; and expediting cost-effective procurements for federal agencies. Use of the BOA will potentially lead to reductions of 24 million tons of power plant emissions through improved chiller efficiency, and will avoid the use of 6 million tons of chlorofluorocarbons.

Reuse of materials saves money. DOE, like many federal agencies, has an abundant supply of formerly used or stored materials that are no longer needed. Reducing the inventory can free up warehouse space and help reduce the associated costs of surveillance and maintenance. Some of these materials have considerable value and can be reused by other DOE organizations or by others outside DOE. In the past, knowledge of the whereabouts and status of potentially useful equipment, clean scrap or chemicals has been the biggest obstacle to the transfer of these materials. The Department is improving its method of tracking and advertising its assets and materials through connections to individual sites through the Internet.

Recognizing that the materials exchange process is a critical step towards pollution prevention, the Office of Energy Research is developing a manual for use by pollution prevention/waste minimization personnel to help select, design, implement, and

conduct an internal program for excess materials exchange at a DOE site. Examples of materials exchange programs for laboratories, pilot plants, and production operations are included to identify specific features unique to each program.

Pollution Prevention Assessments

Sandia National Laboratories and its partners have developed a software program, EcoSys™, which applies computer science and artificial intelligence toward environmentally conscious manufacturing (ECM) design and pollution prevention. EcoSys™ provides users with a uniform method of analyzing the environmental impact of manufacturing based on product design, quantities of materials used in processes, and the environmental attributes of material constituents. With the software package, a user may input a question regarding a manufacturing process, and EcoSys™ provides reasonable choices on how to minimize pollution.

The Pacific Northwest National Laboratory has developed a framework and tools for conducting pollution prevention design assessments. Tools include a guidebook, software installation disks, and a user manual. The package will help facilities integrate pollution prevention concepts into the underlying principles and procedures of engineering design.

Waste Minimization and Reuse at DOE Facilities

When the Bevalac facility at the Lawrence Berkeley National Laboratory closed in 1993, the radiation shielding blocks at the site were no longer needed. These huge, concrete, shield blocks of various shapes and sizes have extremely low-levels of activation and comprise a total of 19,000 metric tons with a volume of 13,600 cubic meters. Because of the large volume of these blocks, it would be very costly to characterize, transport and dispose of these materials in a DOE burial site. Continued use for about 35% of the blocks was located at another DOE site at the Brookhaven National Laboratory. Reusing these blocks avoided the high disposal costs and the need to construct new shielding was averted. Savings are estimated at close to $40 million. The remaining blocks are being evaluated for beneficial reuse at other locations.

Waste minimization, risk reduction, and mortgage reduction are primary goals of the Plutonium Uranium Extraction facility (PUREX) deactivation project at the DOE Hanford site. Successes to date include the sale of 187,000 gallons of slightly radioactive nitric acid for reuse as a product; elimination of approximately 200,000 gallons of radioactive rinsate through reuse of tank flush waters; elimination of approximately 60,000 gallons of radioactive waste water through concentration; re-deployment of approximately 3,000 cubic feet of laboratory equipment, and 2.5 million pounds of chemicals, batteries, oil, and office supplies; strict inventory and project management controls to minimize wastes; and disassembly and removal from use of 12 HEPA filters, thereby reducing the total amount of mixed waste generated by 169 cubic feet.

General Services Administration

The General Services Administration's (GSA) pollution prevention strategy focuses on purchasing alternative products that do not contain or have reduced amounts of hazardous chemicals and educating other federal agencies on purchasing decisions. Although GSA does not manufacture or process toxic chemicals, it does use and transfer toxic chemicals offsite; therefore, GSA is committed to achieving a 50 percent toxic chemical reduction goal by December 31, 1999, by decreasing the agency's total releases and offsite transfers of toxic chemicals.

GSA is working with EPA to incorporate environmental and recycling provisions into the proposed new EPA Regional Headquarters building in Kansas City, Kansas. In the requested building design, a "green rider" specified such features as: high-efficiency heating and air conditioning equipment with automated controls; energy conserving lighting; endorsement of day lighting; and low-flow plumbing fixtures. Many of these items are featured in the proposed Federal Aviation Administration building in the Kansas City metropolitan area as well.[6]

GSA uses hazardous substances in facility management applications (e.g., operation of storage tanks, cleaning operations, renovation), during new construction, and for vehicle maintenance. However, GSA also is using several technologies that eliminate or reduce pollution in its operational activities (e.g., reformulated paints, preservatives and cleaning agents, refrigerant recovery units, parts cleaner recovery units, and closed loop vehicle wash systems that recycle remaining water after it is separated from the wash solution).[7]

GSA has established the New Item Program (NIP) to provide a means to introduce new and improved products and services. GSA uses the NIP to promote awareness of pollution prevention technologies and to maximize opportunities for customers to choose environmentally beneficial products and services.[8]

Buying Green

GSA has rapidly expanded the scope of environmental products included in the national supply system. In addition to office supplies containing recycled content materials, a few examples of these products available through GSA are:

- recycled latex paint
- low VOC paints
- alternative fuel vehicles
- recyclable softballs and baseballs
- automotive refrigerant recycling equipment.

GSA, in partnership with EPA, has launched pilot programs — including the Cleaning Products Program and the Latex Paints Pilot Program — to test the principles outlined in the environmentally-preferable products draft guidance. The Cleaning Products Program collected and published in the GSA cleaning products catalog, information on the performance, cost, and environmental impacts of various cleaning products. The Latex Paints Pilot Program will further promote the purchase of environmentally-preferable products.[9]

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[6] Office of the Federal Environmental Executive. *Greening the Government: A Guide to Implementing Executive Order 12873.* (Washington, DC; 1996) p 45.

[7] General Services Administration, *Executive Order 12856 Pollution Prevention Strategy*.

[8] Ibid.

[9] U.S. EPA, Office of the Administrator. *EPA Pollution Prevention Accomplishments: 1994 - Incorporating Pollution Prevention Into Business Decisions.* (EPA 100-R-95-001. Spring 1995.)

GSA also is committed to reducing or eliminating products it purchases for other agencies or uses itself that contain hazardous chemicals by reviewing and updating its specifications and by using new technologies that promote pollution prevention. GSA's commodity centers develop specifications for products under their management responsibility. Each commodity center currently is reviewing its specifications to determine if hazardous substances can be eliminated from products and/or replaced with industry recognized chemical alternatives. In addition, GSA is evaluating the inventory of products that contain hazardous chemicals stocked at each supply distribution center. If this evaluation reveals that significant quantities of hazardous chemicals are stored onsite, GSA will work with commodity centers to reduce inventories.[10]

Department of the Interior

The Department of the Interior's (DOI) Pollution Prevention Strategy commits the Department to pursuing a hierarchical approach to pollution prevention, beginning with source reduction. DOI's Departmental Manual Part 518, Comprehensive Waste Management, also identifies pollution prevention as the primary approach to managing waste activities on all Interior-managed lands and facilities. Under the Department's Pollution Prevention Strategy, each Bureau is responsible for compliance with the requirements of EO 12856, including developing a baseline for measuring reductions in toxic chemicals (using baseline data no later than 1994), developing facility plans by December 31, 1995, complying with EO 12856 reporting requirements, reviewing and revising specifications, acquisition procedures, and other standardized documents to reduce the purchase and use of toxic materials, and disseminating information about pollution prevention techniques and approaches. The strategy directs each covered DOI facility to report releases and offsite transfers to TRI by July 1, 1995, and commits DOI to voluntarily reduce releases and transfers of toxic chemicals by 1999 as specified in Section 313 of EPCRA.[11]

Okefenokee Refuge

The Okefenokee National Wildlife Refuge consists of 396,000 acres, which provides habitats for a variety of wildlife and recreational opportunities for visitors. Since 1995, the Refuge has eliminated the storage and utilization of over 400 hazardous substances and has decreased its solvent usage by 60 percent through modification of its parts and paint cleaning operations.

DOI issued General Guidance on Pollution Prevention and Right-to-Know in response to Executive Orders 12856 and 12969.[12] This guidance represents DOI's commitment to the sound management and treatment of solid and hazardous waste and other pollutants on DOI managed lands and facilities. It is embodied in DOI's hierarchical approach to waste management (pollution prevention, waste reduction, waste management and cleanup, and restoration). Additionally, this commitment is also reflected in

[10] General Services Administration,*Executive Order 12856 Pollution Prevention Strategy.*

[11] U.S. Department of the Interior,*Executive Order 12856 Pollution Prevention Strategy.*

[12] *DOI General Guidance on Pollution and Right-to-Know* (September 1995).

source reduction strategies in facility management and the acquisition of environmentally-preferable products and services.

The National Park Service (NPS) has developed its own pollution prevention strategy for achieving the requirements of Executive Order 12856. The strategy involves preparing pollution prevention plans for each NPS facility and providing public access to information on the presence of hazardous and toxic materials used and stored. To facilitate compliance with the strategy, NPS sponsored the development of a training course to help NPS employees develop pollution prevention plans, conduct opportunity assessments, and comply with EPCRA requirements.[13]

In addition, DOI implemented an Environmental Achievement Award, which recognizes winners at three levels: Bureaus with outstanding performance, employees with outstanding performance at each Bureau, and contractors with outstanding performance.

Examples of DOI's information transfer initiatives include a series of 30 pollution prevention fact sheets to educate DOI facility managers about pollution prevention opportunities available for certain activities, such as vehicle maintenance, metal working, pest management, building maintenance, concession stands, and others. Some DOI Bureaus have developed their own pollution prevention programs and initiatives. For example, the former Bureau of Mines developed a publication to help hardrock and industrial minerals mining and milling facilities reduce or eliminate environmental pollution. The report includes worksheets designed to help mining facility operators to establish their own pollution prevention programs.[14]

Some parts of DOI are using pollution prevention approaches to their own wastes. U.S. Geological Survey (USGS) laboratories generate various waste streams containing phosphoric, sulfuric, boric, and hydrofluoric acids, potassium dichromate and sodium diphenylamine. These chemical uses and wastes have been targeted for a 50 percent reduction by 1999. The USGS labs have already reduced these wastes through process modifications. Prior hazardous waste annual disposal costs averaged approximately $400,000. To date, reductions have resulted in reduced annual waste management costs to approximately $225,000.

National Aeronautics and Space Administration

In 1994, the National Aeronautics and Space Administration (NASA) developed a Pollution Prevention Strategy in compliance with the requirements of Executive Order 12856. As part of this strategy, NASA committed to prevent or reduce pollution at the source whenever possible. Specific activities described in the strategy include commitments to:

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[13] U.S. National Park Service,*Pollution Prevention and Community Right-to-Know Training Manual.* Prepared by EA Engineering, Science, and Technology, Inc., under Indefinite Quantities Contract No. 1443-CX-2000-95-006, Task Order No. 1, for the National Park Service Hazardous Waste Program.

[14] Witkowsky, D.S.*Pollution Prevention in Mining and Mineral Processing - Waste Assessments for Mines and Mills.* U.S. Bureau of Mines.

- Review and revise NASA specifications and standards to reduce the use of products containing extremely hazardous substances and toxic chemicals;
- Use life-cycle cost analysis and source reduction potential as criteria in setting project priorities;
- Prepare and begin to implement a written pollution prevention plan at all major field installations and facilities by December 31, 1995[15]; and
- Strive for a minimum of 50 percent reduction (from a 1994 baseline) for toxic chemicals by the turn of the century.

To reach the 50 percent reduction goal by 1999, NASA is promoting the development and implementation of Center-specific pollution prevention plans. As an example, NASA Langley Research Center (LaRC) has implemented approximately 30 pollution prevention projects throughout its facility. The results of the projects have been substantial and include:

- annual cost savings of approximately $200,000
- annual solid and hazardous waste reductions expected to reach 77,000 pounds
- air emission reductions of approximately 21,000 pounds per year
- capture for recycle of approximately 394,000 pounds of solid waste annually

NASA LaRC has established a Web site for internal use that contains a new hazardous chemical tracking system to control the purchase of hazardous chemicals. The Web site also provides current statistics on the facility's recycling program by organization. In addition, NASA developed a guidance manual for its facilities to assist them in implementing the requirements of Executive Order 12856 and other related Executive Orders.

U.S. Postal Service

The U.S. Postal Service (USPS) is committed to the reduction of waste and potential pollutants at the source of generation. The USPS Pollution Prevention Strategy includes using environmental considerations among the criteria by which projects, products, processes, and purchases are evaluated. All Postal Service managers are required to participate in waste reduction initiatives, including source reduction, reuse, and recycling activities. The Postal Service's pollution prevention policy is to:

- Encourage the use of non-polluting technologies and waste minimization;
- Protect natural resources and the environment through conservation, recycling, and reuse of materials internally and externally;

[15] Memorandum to Officials-in-Charge of Headquarters Offices; Directors, NASA Field Installations; and Director, Jet Propulsion Laboratory from J/Associate Administrator for Management Systems and Facilities regarding *NASA Policy for Pollution Prevention.*

- Include environmental considerations among the criteria by which projects, products, processes, and purchases are evaluated;
- Develop environmental responsibilities awareness in postal employees; and
- Maintain an environmental quality assurance program.

Waste Minimization and Pollution Prevention at Postal Facilities

The USPS created a Waste Minimization/Pollution Prevention Program for its 28 postal sites, resulting in several source reduction initiatives. A waste management survey conducted in FY 95, indicated that the Northeast Area Plants reduced the quantity of solid hazardous waste generated by over 76 percent since FY 92. The sites generated 12,505 gallons of hazardous waste in FY 92 and 2,988 gallons in FY 93. As a result of the source reduction and recycling initiatives, the sites prevented 12,532 tons of non-hazardous waste from being disposed of in municipal landfills. (Closing the Circle Awards)

USPS is working with EPA through an interagency agreement to perform pollution prevention opportunity assessments and develop pollution prevention plans for eight major facility categories. Completed plans will be included in the Postal Service Pollution Prevention Handbook for use by facility managers and employees in the development of facility-specific pollution prevention plans. A variety of initiatives have been developed and implemented that not only ensure compliance with the law, but will also establish USPS as a leader in the environmental arena. Examples include:

- USPS is implementing an Integrated Pest Management program that will utilize all appropriate technology and management practices and emphasizes non-chemical control techniques over chemical controls.
- USPS presented live, interactive media presentations on *Environmental Alternatives to a Better Vehicle Maintenance Facility* and *Maintenance Initiatives for a Better Environment*. Pollution prevention topics in these presentations included general pollution prevention initiatives, re-refining oil, reductions in EPA's 17 target chemicals, HVLP painting systems, alternative fuel vehicles, pollution prevention training opportunities, aqueous training technologies, and landscaping/pesticide management.
- The USPS Norman, Oklahoma, Technical Training Facility currently provides 17 employee training courses in environmentally-related areas. The Waste Reduction and Recycling course focuses on the pollution prevention hierarchy.
- The USPS New York Metro Area is currently training employees on pollution prevention and recycling initiatives, including the development of a "model facility" pollution prevention plan for a facility.[16,17]
- USPS and DoD's Defense Logistics Agency are working together to support the USPS refrigerant program to reduce reliance on ODCs in accordance with the

[16] U.S. Postal Service. *United Postal Service Pollution Prevention Initiatives* (May 1995).

[17] U.S. Postal Service. *Environmental Facts* (May 1995).

Montreal Protocol and the Clean Air Act.

- USPS has reduced the number of paint spray operations and is upgrading the remaining operations with high volume, low pressure (HVLP) painting systems. To date, 74 paint spray operations have been discontinued and many others converted to more efficient systems. Low volatile organic compound paints also are being used in the remaining operations.

The manager of maintenance operations at the St. Louis Bulk Mail Center replaced wet cell batteries with dry cell, maintenance-free batteries, thus eliminating the hazards from lead, hydrochloric acid, and hydrogen gas associated with wet cell batteries. The switch resulted in an annual savings of approximately $200,000, and environmental benefits through the elimination of waste water contaminants and acid fume emissions. Due to the St. Louis Bulk Mail Center's efforts, the use of dry cell batteries is being considered for implementation at Postal Service Processing and Distribution Centers nationwide (Closing the Circle Awards).

- USPS is now using water-activated adhesives on all stamp products for ease in recycling and inks in the stamp production process that meet EPA's guidelines. USPS also includes recycled content material in stamps, retail, and philatelic products.
- USPS has switched from limited use cardboard mail trays and wooden pallets to longer life plastic trays and pallets. USPS purchased two million plastic pallets in 1994. USPS also purchased 54,000 plastic mail hampers and 335,800 plastic mail containers containing 50 percent recycled content.
- USPS maintains the nation's largest fleet of compressed natural gas (CNG) vehicles (2,700 vehicles have been converted). USPS plans to increase the fleet of CNG vehicles to about 7,000 by the end of 1995. In addition, USPS is the national leader in the use of re-refined oil, with more than 100,000 postal vehicles currently using re-refined oil.

Department of Transportation

In January 1995, the Department of Transportation (DOT) finalized the *Department of Transportation Pollution Prevention Strategy*, which commits DOT to a comprehensive policy of pollution prevention for its facilities and acquisitions. The strategy provides detailed tables summarizing the applicability, major requirements, and key deadlines of Executive Order 12856, as well as responsible DOT offices. In addition, the strategy directs each covered facility to develop a facility-specific pollution prevention plan to include: facility-specific goals for toxic chemical release reductions; an inventory of products used and waste streams containing extremely hazardous substances and listed toxic chemicals; evaluation and selection of pollution prevention alternatives; procedures and a schedule for implementation, communication and training needs; consideration for involving the community; and procedures for measuring success. In the strategy, DOT established a voluntary 50 percent reduction goal in releases of listed toxic chemicals from facilities covered by Section 313 of EPCRA, by the end of 1999. The baseline year for this goal is 1994.

To aid DOT facilities in preparing Pollution Prevention Plans, DOT's Office of Security and Administrative Management has issued a *Guidance Manual for Preparing Pollution Prevention Plans and Pollution Prevention Opportunity Assessments* and an environmental policy manual. The manual discusses pollution prevention at DOT facilities in the context of DOT's primary pollution prevention objectives: to significantly reduce the quantity and toxicity of pollutants released and wastes generated at DOT facilities; to make pollution prevention through source reduction an overriding factor in all environmental management decisions; and to ensure that all DOT activities and facilities incorporate pollution prevention concepts by instilling a pollution prevention ethic through education and training.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) reflects a growing recognition that transportation programs must be compatible with environmental goals. ISTEA, which provides federal funding to state and local agencies for highway, transit and intermodal projects, includes a number of innovations which help states and local areas implement projects that support environmental objectives. States must spend a percentage of highway funds on projects such as bicycle and pedestrian accommodations, storm water runoff mitigation, historic site restoration and other "transportation enhancements." Projects are also being funded under a program created to carry out air quality improvement projects in nonattainment areas. Highway funds may be used for wetland mitigation banks or wetland planning studies. DOT is also implementing the National Bicycling and Walking Study, which sets a goal of doubling the percentage of trips made by bicycling and walking.

DOT is utilizing innovative pollution prevention technologies including materials substitution, process reengineering, and alternative waste disposal options. Examples include:

- DOT is working to ensure maximum participation in the alternative fuel vehicle program by introducing low emission and alternative fuel vehicles into the DOT fleet. Most of the headquarters executive fleet vehicles have been converted to alternative fuel vehicles. DOT is also promoting the use of environmentally-friendly vehicles by the general public.

- The U.S. Coast Guard (USCG) is developing of a model consolidated hazardous materials management program. The program is a centralized hazardous materials management system, including procurement, distribution, inventory and tracking. The USGC is also investigating coating and coating removal processes to determine the most economic, efficient and environmentally-preferable methods of painting and depainting Coast Guard vessels, buoys and lighthouses. The USCG aviation community has developed an aircraft-specific Authorized Chemical Use List and Hazardous Materials Tracking system to reduce hazardous materials usage and procurement.

- The mission of the FHWA's Turner-Fairbank Highway Research Center (TFHRC) includes the development of improved products for highway structure and materials. These products are used by state highway departments and

the highway industry. TFHRC maximizes the use of effective chemicals that are not toxic, corrosive or environmentally damaging in the development of improved products for highway structure and the highway industry.

DOT is currently undertaking several research and development projects to decrease pollution, including evaluating congestion pricing techniques (e.g., time-of-day related parking fees, tolls, High Occupancy Vehicle requirements, and permit parking zones) to decrease air pollution. DOT is also supporting development and testing of clean fuel autos and buses and is working, in cooperation with other agencies, to improve transportation and air quality models so planners are better able to evaluate transportation system impacts. In addition, DOT has funded extensive research on wetlands evaluation and mitigation.

DOT is working closely with federal, state, and local government agencies to implement the Clean Air Act Amendment of 1990 and increase coordination of transportation and land use planning to help reduce emissions. For example, DOT worked closely with EPA on its development of regulations for ensuring that transportation plans and projects conform to air quality plans. Both agencies have worked with stakeholders to address implementation difficulties. DOT and EPA are also cooperating on a proposed public education effort on air quality and transportation. FHWA has worked with states and other agencies to improve management of storm water runoff from highways.

DOT has revised the Transportation Acquisition Manual (TAM) to include all environmental directives, including Executive Order 12856. The revised TAM was published on July 10, 1996. Additionally, several of the Operating Administrations have established acquisition practices to limit their use of extremely hazardous substances. For example:

- The USCG has incorporated pollution prevention in acquisition and procurement in several documents and “green” product procurement awareness is promoted in the headquarters and field environmental and acquisition newsletters.

- The FAA has developed several guidance documents which encourage pollution prevention and environmentally friendly procurement practices. FAA is working to improve its centralized inventory management system and facilitate the procurement of environmentally preferred and affirmative procurement items.

- In keeping with the Department’s goals for reducing or eliminating unnecessary acquisition of products containing extremely hazardous substances or toxic chemicals, the FHWA has two regions which are substituting “green” products for hazardous ones. The FHWA Central Federal Lands Division asphalt testing laboratory is eliminating the use of trichloroethane in asphalt testing and the FHWA Eastern Federal Lands Division has replaced chlorinated solvents with a biodegradable, nonchlorinated solvent for asphalt extraction

testing. The Federal Highway Administration (FHWA) now also requires the use of recycled rubber from scrap tires for a portion of asphalt paving projects.

- Two of the Maritime Administration's (MARAD) ready reserve fleets have incorporated "green" purchasing practices. One fleet has adopted several procurement related policies to help reduce or eliminate the purchase of hazardous materials. Management has changed purchasing procedures that limit quantities of chemicals on hand to an amount essential to operations, thereby reducing releases, deterioration, and waste. Excess or non-usable chemicals are being provided to other agencies for use rather than being disposed as waste and a vigorous recycling program has been instituted. Another fleet has discontinued the use of ozone depleting products, hazardous products such as traditionally used solvents, and initiated training for use of the freon recovery equipment which was purchased in anticipation of regulatory changes.

"We're going to identify what it takes to make the White House a model for efficiency and waste reduction, and then we're going to get the job done....Before I ask you to do the best you can in your house, I ought to make sure I'm doing the best I can in my house."

-- President Clinton

The White House[18]

As part of President Clinton's "Greening of the White House" project, a team of experts performed an energy and environmental audit of the White House and the Old Executive Office Building. The team identified 50 practical opportunities to cut waste, improve energy efficiency, and save money. The actions that the team recommended and the White House has adopted range from installing energy-efficient lighting to minimizing pesticide use and include several model initiatives for preventing waste, recycling, composting, and buying recycled products. Examples include:

- An internal source-reduction policy for workers at the Executive Complex will specify guidelines for reducing paper consumption, using durable products, and conserving office supplies, in addition to encouraging greater use of electronic communications, such as electronic mail and faxing.
- "Grass-cycling" (i.e., leaving grass trimmings on the lawn as mulch instead of raking, bagging, and tossing them) will be practiced on the 18 acres of White House lawns and gardens. The use of offsite composting facilities to manage White House yard trimmings and other organic wastes will be expanded in the near future.
- Increased recycling throughout the Executive Complex will include improving collection mechanisms for materials currently collected (such as placing collection bins more prominently) and establishing collection of new materials (such as household batteries, polystyrene dishes and utensils from the cafeteria, although the cafeteria may eventually move to reusable dishware). In

[18] The White House homepage is located at http://www.whitehouse.gov/WH/EOP/OMB.

addition, the First Family collects recyclables, such as paper and aluminum cans, in the White House living quarters.

- The President's running track, which is composed of rubber recovered from used tires and windshield wipers, is a well-known part of White House efforts to encourage "Buying Recycled." To stimulate markets for recyclables and encourage recovery of materials, staff at the Executive Complex will fully comply with Executive Order 12873, which directs agencies to purchase recycled paper with at least 20 percent post-consumer content. White House Staff also will purchase additional supplies made from recovered materials whenever possible, using the guidance of EPA's proposed Comprehensive Procurement Guidelines.

Federal agencies have made impressive strides in the last six years in developing and implementing pollution prevention strategies. Spurred by the Pollution Prevention Act, the National Energy Policy Act, and a series of Executive Orders dealing with recycling, acquisition, procurement, energy efficiency, reporting of releases to the TRI, and other pollution prevention issues, federal agencies have begun the laborious process of rethinking all the various ways in which their actions impinge upon the environment.

As initial gains are consolidated, new challenges will arise. For example, while government purchasing of products with recycled materials has become well-established, at least for a select group of product categories, the next step is likely to be an expansion of government purchasing into environmentally-preferable products, which will involve a broader and more sophisticated assessment of the environmental impacts of various products. Similarly, numerous individual initiatives have been put in place in federal facilities across the nation. Using ISO 14000 or EPA's Code of Environmental Management Principles, federal facilities must adopt facility-wide environmental management systems that will make pollution prevention a day-to-day reality.

The Role of the Federal Environmental Executive

by
Fran McPoland
Federal Environmental Executive
Washington, DC

It is important that the Federal Government set the example for the American public in the areas of waste prevention and recycling, the acquisition of recycled-content products and the institutionalization of environmentally-preferable purchasing, in order to successfully achieve our national goals. The federal government is a major player in the United States as well as the global market place; it has recently been estimated that the U.S. government procures $225 billion of goods and services produced annually.

My role as Federal Environmental Executive was established by EO 12873 Federal Acquisition, Recycling and Waste-Prevention (October 20,1993). This Executive Order is responsible for making every Federal agency accountable for requirements established by the Resource Conservation and Recovery Act (RCRA) of 1976. RCRA provided for the initial framework for Federal waste prevention, recycling and affirmative procurement programs. Unfortunately, until the promulgation of this EO, sustained activity in the recycling arena by Federal agencies was often not practiced.

I see three major objectives stated in Executive Order 12873:

- reduce the amount of waste material generated at its source
- recycle waste generated and reduce the amount landfilled
- increase the procurement and use of products containing recycled content and environmentally-preferable products.

My aim is to promote further applicable recycling activities, to unite the on-going federal effort in these areas and to provide clear direction for their continued success in these efforts. The Office of the Federal Environmental Executive oversees the environmental programs covering more than 3 million employees, plus a number of state, local and contractor personnel nationwide. As a significant consumer of products ranging from office supplies, vehicular components, building materials and electronics, the Federal government has a great potential for positively affecting the market for products that pose fewer burdens on the environment and human health.

There are a number of significant successes in this area that I would like to share. Major procuring agencies such as the General Services Administration (GSA) and Department of Defense (DOD) have published catalogs of environmentally-friendly or "green" products in order to assist their customers purchase products that will make a difference. The criteria used to segregate products in these "green catalogs" is based on manufacturer environmental claims; unfortunately the only assurance that one has regarding these claims is the strength of the FTC "Truth in Advertising" requirements.

EPA and GSA recently completed a joint project on products used to clean federal buildings; as a result, EPA has developed a matrix system which facilitates the actual decision process as to which products are best suited for a specific situation. The Postal Service is currently adopting this draft matrix system into their environmental

awareness training so that their employees will purchase products that are better for the environment. This is the first pilot study within the federal community to incorporate the use of the GSA/EPA environmental attribute matrix system agency-wide.

Agencies across the country are making significant progress in purchasing products with recycled content as designated in the EPA Comprehensive Procurement Guide (CPG). Procuring agencies have developed and implemented aggressive Affirmative Procurement Programs in which they purchase products such as paper containing 20 percent recycled content, retread tires, re-refined lubricating oils, and building supplies and office products containing a prescribed recycled content. In fact, the White House practices what it preaches and recently demonstrated that 98 percent of the copier paper it uses contains the required recycled content.

Also required by EO 12873 is that federal agencies purchase "environmentally-preferable" products. The EO defines "environmentally preferable" as products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose.

Environmentally-preferable products are extremely important since the concept of comparing products and their environmental attributes pushes the technological advances for these product lines, thus creating new environmental benchmarks. In addition, the EO promotes the use of products possessing an environmental advantage within the federal government, and thereby ensuring that a market exists for these products and the ensuing technologies.

A clear and concise definition of "environmentally-preferable" products is still evolving; it is a complex issue with many diverse and technical attributes and considerations. So far, a number of agencies have attempted to determine what "environmentally preferable" means to them and I believe that all of these actions are leading to stronger and more concrete guidelines; progress is being made and more and more issues are being raised to the forefront.

I believe that our technology regarding environmentally-preferable products is in its infancy. At this point, we are not even certain of which questions to ask regarding product lines, and in many cases, such as life cycle analysis, information is not yet available. And how do we use this information to procure products in a discriminate manner? With the continued progress of the manufacturers, the consumers, public interest groups and third party certifiers, our information base will evolve so that we can more confidently make informed decisions regarding environmentally preferable products in the future.

Another significant requirement of EO 12873 is recognition of federal agencies for their achievement in meeting the objectives of this order; for this purpose, the White House Closing the Circle Award was established. The Closing the Circle Award is intended to recognize efforts that make significant contribution for, or impact on, the environmental community in specific categories. Waste prevention, recycling, affirmative procurement, environmental innovation, model facility demonstrations, and sowing the seeds for change are all categories under which federal agencies can submit nominations.[1]

Last year the Office of the Federal Environmental Executive received 233 nominations form different federal agencies for the Award. One of my proudest moments as the first Federal Environmental Executive was the invitation by the National Performance Review to submit our 1996 Closing the Circle Award winners for the prestigious Vice President's Hammer Awards. The Hammer Award recognizes federal employees who have promoted "reinventing government" principles in the way their agencies do business. These principles include putting customers first, cutting red tape, empowering employees, getting back to basics, and simply making the

[1] Each of the various award categories are discussed in this chapter.

government work better. The Office of the Federal Environmental Executive submitted 22 nominations to the National Performance Review for federal agency employee-teams who have been recognized by this office's Closing the Circle Awards. Examples of federal agencies that have recently received a Hammer include: the Affirmative Procurement Team at McChord Air Force Base near Seattle, the St. Louis Maintenance Free Battery Team at the St. Louis Bulk Mail Center, and the U.S. Postal Service Northeast Area Processing and Distribution Facilities.

McChord's Affirmative Procurement Team "Buy Recycled" campaign resulted in both the purchase of over $1.2 million in products with recovered material and over 9,000 waste-recycling containers produced from recycled plastic. Overall, the Affirmative Procurement Team's campaign yielded an impressive increase in the purchase of recycled products; purchases rose from 8 percent in early 1995 to above 85 percent by the year's end.

The St. Louis Maintenance-Free Battery Team was commended for successfully reducing the hazards to employees, achieving an annual savings of approximately $200,000, and realizing the benefits of eliminating wet cell battery waste water contaminants and acid fume emissions. The U.S. Postal Service established a comprehensive Waste Minimization/Pollution Prevention Program for its 28 postal sites. Their FY95 Waste Management survey demonstrated that hazardous waste was reduced by 76 percent and that 95 percent of nonhazardous waste was diverted from municipal landfills.

These examples cited from our Closing the Circle Awards prove that implementing environmentally-conscious ideas not only helps the environment, but such actions are potentially economical and efficient to the taxpayer and environment itself. Finally, there is a clear Presidential mandate concerning the importance of reducing unnecessary stress on the environment while implementing processes to allow the government to function more efficiently.

I believe that "this relationship is critical in establishing a more intensive environmental consciousness within the American public, resulting ultimately in the paradigm shift to a "greener" U.S. culture."

DOD State of Pollution Prevention Report

by
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DoD's environmental program has matured considerably over the past decade. Once criticized by environmental groups for its apparent indifference to environmental concerns, DoD has steadily won recognition from these critics for its environmental performance. We earned their recognition by building a team of over 8,000 environmental professionals and making significant annual investments -- now nearly $5 billion per year to meet environmental obligations. We also developed an extensive education and training program; obtained the commitment of senior DoD leadership as well as every sailor, soldier, airman, and marine; and revamped the budget policy to ensure we comply with all legal requirements.

The results of this program overhaul have been dramatic. The numbers of legal violations have fallen significantly. The volume of hazardous waste disposal has been sliced in half. Recycling programs operate at every installation. Species, endangered elsewhere, flourish on our ranges and training areas.

While proud of these accomplishments, we recognized that we can improve our approach to environmental management. We had relied almost exclusively on strict end-of-pipe controls and extensive monitoring to comply with established standards and procedures. While this approach was very successful in avoiding legal violations, it did not necessarily achieve the best overall environmental performance within the funds we have available. Our new goal must be continual improvement of environmental performance though the use of new technologies, new partnerships, smart business decisions, and an emphasis on eliminating pollution at its source. We are integrating this new approach across all DoD activities from base operations to the entire life cycle of our weapon systems. We want to do more than merely meet the established legal requirements. We want to strive for the highest performance possible with the funds the American taxpayer provides.

In adopting this new philosophy, DoD faces two major challenges. Our first challenge involves the traditional emphasis on end-of-pipe, command-and-control requirements. Our second challenge involves the current federal budgeting process which focuses on meeting short-term legally-mandated requirements. DoD is taking on both of these challenges by creating new innovative partnerships with industry, regulators, and the public.

As the first step in implementing our new philosophy at base operations, we revised our policy directives, instructions, and budget development guidance to encourage the use of pollution prevention projects as the preferred method to achieve compliance, and to implement a longer term investment strategy. We also inserted these messages into the education programs for environmental engineers and other professions whose activities or decisions affect environmentaloutcomes. And we required every installation to develop a plan to identify and assess long-term pollution prevention opportunities.

We initiated a pilot project with EPA, called ENVVEST, to demonstrate at our installations that alternative environmental management strategies can produce greater environmental quality at equal or lower costs. Similar to EPA's Project XL for the private sector, the concept of ENVVEST is simple -- provide flexibility to a military

installation and the local regulators, with stakeholder involvement, to develop specific projects to protect human health and achieve greater overall environmental performance, within the installations' original budget. Through ENVVEST, we hope to trade paperwork for performance.

One of our most effective initiatives for improving environmental performance involves the adoption of pharmacy procedures and other state-of-the-art business practices to manage hazardous materials. A single office at each installation controls all purchases, maintains all stocks, distributes materials to the shops when required and in quantities sufficient for the immediate task, and disposes of all excess materials. Implementation of this simple management technique has greatly improved our environmental performance and reduced purchases and disposal costs.

We are also working to adopt this new philosophy in the operation and maintenance of existing weapon systems, which accounts for most of the hazardous materials managed by DoD. Most of this hazardous material use is required by tens of thousands of military specifications and standards. Our strategy is to revise or eliminate the use of standardized documents requiring hazardous material use. Changing these standardized documents is not an easy or inexpensive proposition. That's why DoD is working to focus its pollution prevention efforts on those weapon systems, associated maintenance processes, and standardized documents that drive the bulk of our toxic releases using the results of DoD's recently published Toxics Release Inventory.

We are also applying our new philosophy to the way we buy, design, and build new weapon systems. We are putting in place new acquisition policies and procedures that require the program manager to analyze the system's life cycle environmental effects in testing, production, deployment, and disposal and to identify opportunities for pollution prevention prior to any major decision. And we are not limiting these efforts to our own installations. We are also working with our major contractors to reduce toxic chemicals used in manufacturing processes to build or maintain our weapon systems.

This is an exciting time for environmental professionals. Environmental challenges have grown significantly over the past few years. New partnerships, smart business decisions, new technologies and perhaps most of all, a preventive approach will ensure we protect human health and the environment for generations to come.

Energy and Environment: Common Ground on the Bridge to the Future

by
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Christine Ervin has recently joined the President's Council for Sustainable Development as Senior Advisor on Climate.

The 19th century English poet Matthew Arnold wrote of "wandering between two worlds, one dead, and the other powerless to be born." We are faced with such a dilemma today. Our long-held environmental and energy paradigm represents the past, and another rapidly emerging paradigm represents the future.

Our past behavior is largely a legacy of an extraction economy where fresh resources were appropriated without regard for limit, and where new resources were available just over the next horizon. Many now believe that this paradigm is outmoded and remains with us primarily because of inertia. In contrast, an emerging paradigm views limited planetary resources as gifts to be efficiently used, for this and for all future generations. The press of population and increasing expectations and levels of affluence highlight the need to change our traditional world view.

The world has grown by nearly half a billion people (over 8 percent) since the Clean Air Act Amendments of 1990 were enacted. During that same 5-year interval, the population of the United States increased by 13.9 million people, from 249.9 million to 263.8 million (+5.6 percent). According to Sir Robert May, an American currently working in London as the Chief Scientific Advisor to the United Kingdom government and Head of Office of Science and Technology, "humans currently appropriate between 1/4 and 1/2 of the productive capacity of the land to their own ends; and about 1/10 of the productive capacity of the oceans." What matters is our numbers, AND the resource intensity of our planetary footprints. A baby born in the United States is likely to consume Earth's resources at a rate 3 times that of a baby born in Italy, 13 times more than one born in Brazil, 35 times more than for one born in India, 140 times more than one born in Bangladesh or Kenya, and 280 times more than one born in Rwanda, Haiti or Nepal. Over the next decades, we will work to raise the standard of living in the developing nations; equity and justice demand that we do so. Ecological and economic realities demand that we use fundamentally new patterns of development.

Since passage of the National Environmental Policy Act in 1969, we have made great progress in cleaning the environment and resolving some of the most noticeable insults. But by focusing on the most severe pollution, we have unwittingly short-changed our longer-term thinking. Consequently, while we can expect some additional benefits from legal "command and control" approaches, we can also expect greatly increasing compliance costs. Currently, compliance costs are estimated at $150 billion per year, and are expected to increase towards $200 billion per yearby the end of this century. We already have made the "easy fixes," eaten the "low-hanging" fruit. The existing paradigm for environmental protection is approaching diminishing returns.

As the *Economist* noted: "The production and use of energy does more environmental damage than any other activity." And the world's appetite for energy in the new millennia will increase dramatically. In this decade, we will invest over $1 trillion in new energy infrastructure and that trend is expected to continue over the next

several decades. Fortunately, we are fostering an alternative. Instead of controlling the effects of pollution after it is already generated, we are taking a new approach to pollution, one that is familiar to the public health community but one that is just emerging in the environmental field: prevent it from occurring in the first place.

If we are imaginative and bold, we can forge this new paradigm and a world that until now has been largely powerless to be born. In this world, "lean and green" manufacturers will see environmental regulations only as a backstop on the playing field of pollution prevention, comprehensively intelligent design and competitive advantage. Since energy is vital to manufacturing, energy efficiency and renewable sources of energy must play a far greater role. Solutions will be far more comprehensive and systematic than today's single-pollutant, single-media focus. DOE's Office of Energy Efficiency and Renewable Energy is helping forge this future and is leading the nation to a stronger economy, a cleaner environment, and a more secure future through development and deployment of sustainable energy and manufacturing technologies.

For example, DOE's Industries of the Future effort is helping seven U.S. primary industries chart technology roadmaps for the future. Recently, the Forest Products industry's environmental compliance costs were estimated at $11 billion. With the help of DOE-catalyzed technology roadmaps, the industry looked comprehensively at their entire process and redesigned it to produce enhanced product with much less pollution. Using the new approach, compliance costs are now estimated at about $3 billion, a 70 percent reduction.

In addition, our RD&D energy programs are aimed at preventing pollution now and for the next century: Compact Fluorescent Lamps; Electronic Ballasts; E-Glass; efficient Flame Retention Head Oil Burners; Computerized Building Design Tools; high-efficiency Refrigerator Compressors; Photovoltaics; Geothermal Heat Pumps; AC Electric Automotive Drive Trains (GM's new electric car, the Impact); Sulfur-Lamps (now used by the Smithsonian's Air and Space Museum). These investments not only help the environment by preventing the emission of millions of tons of pollution, they lower the cost of using energy, thereby saving consumers and businesses billions of dollars a year. The national wealth created by just a handful of these technologies has more than paid for all of the funding required to operate the Office of Energy Efficiency and Renewable Energy since 1978.

Yet for these and other technologies to reach their full promise, we need to engage the imagination and deployment resources of the private sector and all federal agencies. We need new strategies to link Technology Policy with Environmental Policy to convert increasing challenges into market opportunities. We need to find effective ways to stimulate technological innovation as an environmental tool. We need to move our legal and institutional structures in directions that accommodate and nurture innovation. We need policies that encourage comprehensively integrating environmental considerations into the means of production. The world market for environmental and efficiency technologies is estimated at $800 billion by the middle of the next century. The future will belong to those who best integrate resource efficiency into product and factory.

Buckminster Fuller summarized the dilemma of our collective inertia on the first page of his *Operating Manual for Spaceship Earth*, where he described a shipwreck and a shortage of lifeboats. A floundering, but aspiring, designer grasps for a piano crate for flotation to save her life. Safely back on shore, the designer is given the task of designing lifeboats. Should her designs look like piano crates based on successful past experience? Or should her designs look comprehensively at the problem, and set aside design pathways that descend from expediency, matters of convenience and habit?

We must not cling to piano-crate thinking. Energy choices made in the United States over the last several decades in manufacturing, transportation, and construction significantly effect today's environment. Likewise, energy choices and investments made today will have profound consequences for future environmental quality.